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In the case of the Irish and English survey, as he before remarked, they were fourteen days intensely occupied in obtaining simultaneous observations, and he believed it resulted only from their very perfect calculations that they were enabled so truly to direct their telescopes and eventually succeed.

MR. T. MACLEAR, F.R.G.S., Astronomer Royal at the Cape, was convinced from experiments which had been made at the Cape of Good Hope, that with a five or six inch screen, from 120 to 200 miles a glass might be seen as a star of the fourth or fifth magnitude, through a small telescope. They had very successfully employed signals at a distance of 25 miles.

MR. GALTON remarked, in answer to Sir E. Belcher, that the difficulty of aim was altogether independent of the distance, and that, with his own hand-instrument, the horizon could be swept, and a correspondent sought out, with the utmost facility, as he himself had continual occasion of experiencing. But, on the other hand, without some optical contrivance for knowing accurately where the flash was being sent, it was extremely improbable that the small cone of rays which proceeded from the mirror should be thrown in the desired direction, and still more so, that it should be made to cover the distant station for a sufficient length of time to be properly visible.

The second Paper read was:—

2. *Latest Accounts from* DR. LIVINGSTONE, F.R.G.S., *of the Central African Expedition.*

THE numerous papers received from Dr. Livingstone refer to two main points: the one the navigability of the Zambesi, and the other the capabilities of the valley of its affluent, the Shiré, and those of the Shirwa lake, which adjoins it.

The Zambesi has been examined five times over from between Tete to the sea, and Dr. Livingstone's conclusion is, *firstly*, that a navigable entrance has been determined by Captain Berkeley, of H.M.S. *Lynx*, up the Luabo, and by himself up the Kongone. *Secondly*, that a large vessel could be taken up to Tete at any time between January and April. (This is the unhealthy time of the year; but the Zambesi fever has hitherto appeared a far less formidable illness than was feared.) *Thirdly*, that in a season of unusual drought there were found to be only three crossings, from one deep channel to another, over which his little steamer had to be dragged. These were from 24 to 18 inches deep, and from 100 to 150 feet long. The force of the current of the river averages  $2\frac{1}{4}$  knots, but never exceeds 4; and Dr. Livingstone considers that a vessel, literally drawing no more than  $1\frac{1}{2}$  feet water, could ply at all seasons for the first 300 miles of the Zambesi.

Above Tete the case is different. The long rapids of Kebra-brasa commence 30 miles from that town. They were visited by Dr. Livingstone when the river was still at its lowest, and he describes the appearance of the first part of them as follows:—The river was

confined to a channel of only 30 to 60 yards wide, with perpendicular and water-worn sides of from 50 to 80 feet high. This narrow channel wound, from side to side, through a dry upper bed of about a quarter of a mile broad, that was strewn with huge blocks and boulders in the wildest confusion, and was overflowed by the river at the time when it was high. Even in this narrow channel the river rarely ran more than 4 knots an hour: that speed was, however, too much for Dr. Livingstone's steamer (of which he bitterly complains). He therefore left her behind, and continued his examination on foot. The journey was exceedingly toilsome. The worst cataract seen, was one where the fall appeared to be 30 feet, and where the river was confined between precipices of 500 or 600 feet high.

A second expedition was made to these rapids in January, under the command of Mr. C. Livingstone and Mr. Baines, at a time when the Zambesi was nearly at its highest. The party started in a boat and went as far up the rapids by paddling and by tracking as it was possible to venture: they then continued their exploration on foot. The face of the river had become greatly altered; but the minute report of Mr. Baines appears to hold out little hope of its navigability under any circumstances. He speaks of one rapid with a fall of 3 feet 9 inches, and of eddies along which no vessel larger than a boat could venture with safety, lest her head and stern should be caught by the opposing currents. At one place the river was in part taken up by "uphevings of the water 4 feet or more in height, rising and falling in most undescribable confusion," and elsewhere by eddies and a shallow flat covered with sharp stones. The great fall seen by Dr. Livingstone was still there, but did not appear so formidable. Mr. Baines has made drawings of the rapids, which are to be seen in the Society's rooms. Mr. C. Livingstone's opinion, and Dr. Livingstone's conclusions, appear more favourable than those of Mr. Baines.

*Shirwa Expedition.*—At the time that Messrs. C. Livingstone and Baines were examining the Kebra-brasa rapids, Dr. Livingstone and Mr. Kirk explored the Shiré in the steamer. They were obliged to leave her in lat.  $16^{\circ} 2'$ , long.  $35^{\circ}$  E., whence, travelling on foot—at first alongside the river and then leaving it and going to the N.E.—they reached a lake of large size, hitherto unknown to Europeans, and called the Shirwa. The steamer was ultimately taken up an affluent of the Shiré to within 30 miles of the lake. The lake has no outlet: its waters are bitter, but drinkable. It is 2000 feet above the sea, 25 to 30 miles broad, and 60 to 70 miles long, in addition to a narrow southern prolongation of 15 miles more, and it is stated to be separated from Lake Nyanja, on the north, by a strip of land of no more

than 6 miles wide. A hill of 6000 feet separates the valleys of the Shiré and the Shirwa. There are other hills besides: nearly all of them are thickly covered with grass and trees, and are very beautiful. The paths in the valley are but a foot wide, and lie through dense grass 6 or 8 feet high. A few yards often hide a companion completely, and guides are absolutely necessary. The soil of the entire country is rich and well cultivated in patches. Cotton is largely grown: everybody spins and weaves it. Two parties of Ajana slave-traders were on the Shirwa at the same time as Dr. Livingstone: they were in the habit of carrying their captives to Quillimane. Dr. Kirk's report closes as follows:—"We have thus shown a navigable river to exist upwards of 100 miles in length, a people engaged extensively in agriculture, with a soil capable of growing not only cereals but also cotton and sugar-cane of excellent quality, and in almost unlimited amount. This rich valley may be divided into three portions: the *first* near the Zambesi, about 20 miles in length, cultivable; the *second* only 15 miles, marshy, but abounding in game; the *third* 25 miles: this is probably both the richest and healthiest of the three. The general width may be estimated at 20 miles. The situation of Morumbala, at the junction with the Zambesi, would be of the greatest importance to Europeans as a healthy station midway between the growing districts and the sea. While in the river none of our party complained of the least sickness, although we were much exposed, and this is the unhealthy season." Dr. Livingstone expresses an earnest hope that a more efficient steamer may be sent to him, even though it be purchased out of his own funds. He replies with warmth to the objections of those who do not credit the future commercial value of the countries bordering the Zambesi, and he points out the advantages which would attend a colonization of their healthy highlands by a British community.

MR. T. MACLEAR, F.R.G.S., observed that Dr. Livingstone had forwarded to him—one of the essentials in discovery—a very considerable amount of astronomical observations for latitude and local time, also five observed occultations, by which the longitudes of the places discovered had been determined with great accuracy, and free from instrumental error.

The CHAIRMAN said that perhaps Mr. Crawford would defend his own opinions on this subject.

MR. JOHN CRAWFURD, F.R.G.S., said it was possible he might be the individual alluded to by Dr. Livingstone, and would certainly desire to have the opportunity of saying a word or two in his own defence; but at the same time he was determined not to say a syllable that might be considered disrespectful to that most enterprising traveller. Dr. Livingstone did not say that he was either a merchant or an agriculturist; and he (Mr. Crawford) had a perfect right to dispute the opinions advanced by him on those subjects. First, then, as to the Zambesi. He still held by the conviction that the Zambesi is not a navigable river. Take Dr. Livingstone's own description of the river, and he

would then ask for what sort of vessels is it navigable? During the time the river was at its highest, which was from November to March—the South African summer—the places on its banks were so unhealthy that they could not be passed without great risk; so that, at the most, for one half of the year the river was not navigable. With two and three feet water only in its upper course, what sort of a navigable river was that? The Zambesi could not be made available for commercial purposes in the English sense of the term. The next point respected the growth of wheat. Now, what he (Mr. Crawford) really had said on a former occasion was, that the natural country for the growth of wheat was not within the tropics—that nearer than  $25^{\circ}$  or  $26^{\circ}$  latitude wheat could not be grown to advantage. He did not say it might not be grown within the tropics at a high elevation—even upon the very equator itself. Dr. Livingstone saw a few patches of wheat growing on the mud-banks of the Zambesi in  $16^{\circ}$  of latitude, but at what elevation he does not state: that circumstance, however, did not prove that wheat was the proper grain to grow in that country. Rice had been grown in this country—a capital crop was obtained some years ago near Windsor—but it did not follow that rice was the proper crop to be grown in Britain. Now a word about indigo. He (Mr. Crawford) complained of the African indigo for its being too short, and not for its being too long. Dr. Livingstone was totally mistaken about that matter. As to cotton, he would say in plain terms, you will never get good cotton from the savages of Africa. It is impossible that such a people should produce cotton fit for the manufactures of this country. The Hindoos were a highly civilised people in comparison with Dr. Livingstone's negroes; but, if we were to depend upon the people of Hindostan, nine-tenths of the greatest manufacture of this country would perish at once; and if we were to depend on African cotton, we should speedily be in a worse condition than we were two hundred years ago. Dr. Livingstone had broached the subject of African colonisation, and thought a region in the 16th degree of latitude a proper locality for Scotchmen to plant themselves in. He (Mr. Crawford) was not the Scotchman to go there himself, and he strongly advised Dr. Livingstone's twenty Scotch families, with their highly respectable pastor, to let it alone. According to Dr. Livingstone, they might get a hundred square miles of land for a song, but they might just as well get a hundred square miles of cloud above their heads, for all the good such land would do them.

MR. LYONS M'LEOD, F.R.G.S., said, from his experience of the Niger expedition he was convinced that the proper time for ascending the rivers of Africa was during the rainy season. The Zambesi should not be ascended later in the year than March; and at that time he had not the slightest doubt that a vessel drawing eight feet of water could not only reach Tete, but anchor at Zumbo, and have the whole of the interior of Africa at command. Some months ago he had stated in that room that wheat was grown at Tete, and his statement had now been confirmed by Dr. Livingstone. He had also said that sugar was grown—that the natives were not only acquainted with the sugar-cane, but actually made sugar, not very good, indeed, because the process of manufacture was but ill-understood. He had remarked that an abundance of cotton was to be found all over Eastern Africa. And not only so, but he had brought specimens of the cotton home. The commonest of all, which was not thought to be fit for the manufactures of this country, was spun into stockings by the ladies of Liberia, so that what we despise is valuable there. He had brought home specimens of timber; it was said that the wood was not adapted for any purpose whatever, and certainly not for ship-building; however, at the instance of the Admiralty, these specimens were sent down to Woolwich. A vessel, moreover, of 500 tons burden, built of Seychelles timber, had been submitted by the owners to the Admiralty, to be pulled to pieces if desired; and specimens of the timber of that vessel might now be seen in Somerset House,

and should be seen by those who think that East Africa does not produce timber. The Lords of the Admiralty were convinced to the contrary, and they had given him a commission to assist in obtaining timber from the east coast to rebuild our navy. Along the whole of the east-coast rivers immense forests of timber were to be found, and much of the wood was admirably adapted for ship-building purposes. To return to the question of the navigability of the Zambesi. If they went up in the rainy season, when the deltas were covered with water—and a steamer could then go right through that belt of death before the malaria could affect those on board of her—he saw no reason whatever why they could not reach Tete from Quillimane in five or six days' time. It had been imagined that there was only one mouth to the Zambesi, but the Portuguese had known of the other mouths, through which Dr. Livingstone went, for thirty years, and by means of that knowledge they had been enabled to escape with their cargoes of slaves from the English cruisers. They had led the commanders of the cruisers to suppose that they would obtain a prize at the Quillimane mouth of the river, and, while they were watching there, the slave-ships escaped by the other outlets. Now that Dr. Livingstone had discovered their secret, the Portuguese had established custom-houses at the Loando mouths of the river for the purpose of preventing English commerce. The question therefore arose, are we to open the interior of Africa for the benefit of the Portuguese? The sooner the question was settled, the better for the commerce of this country and the interests of the people of Africa. What we were doing now in the interior of Africa was simply for the benefit of the Portuguese, and this state of things must not be allowed to continue.

CAPTAIN BEDINGFELD, R.N., F.R.G.S., said,—that it was with feelings of considerable mortification that after a voyage of 10,000 miles and back he was unable to give as much information as he could have wished upon a subject of such interest to the Society. It was, however, well known that, owing to misunderstanding between Dr. Livingstone and himself, he was sent home soon after he arrived in the Zambesi.

He was aware that that was not the time or place to enter into particulars as to the cause of his leaving the expedition, and that were he to do so it might appear like putting a man on his defence during his absence, which he did not wish to do, but asked the indulgence of the Meeting while he endeavoured to show that he did not desert the expedition when in difficulty, or as Dr. Livingstone expressed it in his published letters, "when he thought they could not move hand or foot without him."

The CHAIRMAN said,—he was sure that all present entertained the greatest respect for Captain Bedingfeld's former services on the western coast of Africa, whilst they must have regretted that any misunderstanding should have occurred between Dr. Livingstone and himself. This, however, was not the proper time and place for any explanation, because Dr. Livingstone had not preferred a word of complaint against Captain Bedingfeld in any Memoir read before the Royal Geographical Society. It was therefore to be hoped that the gallant officer would not proceed further in his personal explanation, but confine his remarks to points purely geographical.

CAPTAIN BEDINGFELD.—So long a time had elapsed since his return that the earlier events would have lost much of their interest; without therefore entering into detail he would endeavour to mention such as are connected in some way with the navigability of the river.

The expedition arrived off the river on the 14th May, 1858, but, owing to a gale of wind from the south-east, did not get into the "Luawe," or West Luabo, until the following day. They were directed to examine this river in the first instance, as it was then supposed to communicate with the Zambesi, and to have a better bar than the other mouths.

On the 16th the steam-launch was hoisted out, and having been put

together they commenced its exploration to (what he believed to be) its source without finding any communication with the Zambesi. It was then decided that Mr. Shead, the Admiralty Surveyor, should leave in the *Pearl* and endeavour to find an entrance into Parker's Luabo (or Kattrina) mouth, as it is called by the Portuguese, and on the 30th, in company with Her Majesty's Ship *Hermes*, she steamed to the eastward, and he was left in charge of the steam-launch.

On the 3rd of June the *Hermes* returned off the bar and made signals to him to come out to her; this was not easy for a vessel 75 feet long, and whose gunwale was only 18 inches from the water, and it was a pretty severe trial of how her sections were put together; they got out safely, however, and having been taken in tow by the *Hermes*, off the bar of the "Kongone" (where the *Pearl*, having found a channel, was at anchor inside the bar), waited for high-water to make a push in. It had been arranged by Captain Gordon that upon their arrival the master of the *Pearl* should send down one of his (Captain Bedingfeld's) whaleboats inside the bar to point out the channel to him; but although the *Hermes* fired several guns this was not attended to, and as he was obliged to get in at high-water, Captain Gordon endeavoured to point out the way; unfortunately, and partly owing to the sun shining full in his face, he made a mistake, and after he (Captain Bedingfeld) was well in amongst the breakers, he found he had to haul up to clear a sand-bank or go on shore; this was a dangerous business, but the little launch behaved nobly, and with the exception of being half swamped, they got in without accident.

Having sounded the bar of the "Muselo," or "Tinbue" (the Kattrina had been previously sounded by Mr. Shead) and examined the river ahead, it was decided to take the *Pearl* through the narrow creek, 20 yards wide and about  $4\frac{1}{2}$  miles long, connecting the Kongone with the Zambesi, in lat.  $18^{\circ} 41'$  s., long.  $36^{\circ} 3'$  E.; this was done with some difficulty, and having ascended about 9 miles from this entrance, the *Pearl* was finally brought up by shoal-water on the 13th of June, 20 miles from the mouth of the river.

After a consultation it was now decided that an island should be selected upon which to land their stores in order that the *Pearl* might at once proceed on her voyage to Ceylon. The island thus selected was about 20 miles farther up, called Nyeka (or by them Expedition Island). On the 16th he commenced to take the stores out of the *Pearl*, and by the 26th, iron-house, sugar-mill, saw-mill, spare engine, numerous stores, including 6 tons of coal, in all at the lowest estimate 40 tons, had been towed up by the steam-launch a distance of 20 miles, against a current averaging  $2\frac{1}{2}$  knots an hour; they had occasionally a heavy pinnace, carrying 6 tons, and a cutter with about 2 tons in tow at the same time, and with a small quantity on board she would keep up a speed of  $4\frac{1}{2}$  miles an hour.

The *Pearl* was dismissed on the 26th June, and Captain Gordon of the *Hermes*, his surgeon Dr. Ord, Mr. Shead, and 20 men left in her. To Captain Gordon they were indebted for every assistance in his power, both in men and boats, and he finally left his pinnace, fully rigged, with them; without her they never could have got up all their stores.

From this date to the 31st July he was fully employed in exploring and towing up goods as far as Senna, and in making a rough chart of the river; this latter was not easy, as he had at the same time to watch the ripple closely to avoid running aground, to teach his kroomen to take the helm and lead, and also to get an occasional help with the sails.

From where the *Pearl* anchored, almost the whole way to Senna, the river is one labyrinth of islands, shoals, and ledges, the current even at that time of the year (June) running 4 or 5 miles an hour; they frequently could not find even 3 feet of water, and had to return for miles to grope out a channel, the river in some places being between 2 and 3 miles wide. At Senna itself there

was no approach that year within a mile, the river having deepened on the opposite shore, and from the constant shifting of banks and even whole islands it is difficult to lay down soundings at all correctly; had, however, his rough chart been sent home (which was taken from him by Dr. Livingstone together with his instruments), it would have given some idea of the depth of water at that time. He might add, that owing to the changeable nature of the river, the Portuguese have almost entirely given up the use of launches, as they find the canoes swifter and better.

The river sometimes overflows its banks, but not often; the last time it did so was in 1839; at that time the course of the Mutu could not be distinguished, and canoes came direct overland from the Zambesi to Quillimane. At the end of June 1858 the bed of the Mutu was about 8 feet above the level of the Zambesi, with long grass growing in it: the water abreast of it was about  $2\frac{1}{2}$  feet, but there was a deeper channel on the opposite side of the river.

With regard to the entrance of the Zambesi, the only bars worth surveying would be the "Kattrina" and "Kongone;" the former if properly surveyed would prove to be the best, as it was the direct discharge to the largest body of water, and after passing the bar an advance of 10 miles clears the mangrove; you then come to high grassy banks that extend all the way to Mazarro of the Mutu. It should be remarked that from the mangrove to Shupanga, a distance of 70 miles, there is no wood fit for steaming purposes.

The Kongone has the objection of the narrow creek with two awkward elbows, and as many banks; the average depth at high water is 11 feet.

The Musélo has too wide a mouth, and is too much exposed to the south-east ever to be of much use. On a smooth day when they sounded it they had to turn back for the breakers in 10 feet.

Mr. Cooke, the master of the *Lynx*, has made the best plan of the entrance, but it is evident, if ever the river is opened for trade, much more time must be spent on the survey than any of them had at their disposal, and regular pilots would have to watch the constant changes.

The Quillimane bar has  $3\frac{1}{2}$  fathoms at high water spring-tides, but the communication with the Zambesi is cut off several months of the year. The creek near the entrance connecting it with the other mouths is a mere ditch, dry at low water.

The climate in June was delightful, with the exception of thick fogs in the morning; the thermometer at night was frequently down to  $50^{\circ}$  Fahr. The two or three cases of fever they had were, in his opinion, mainly caused by exposure to the fogs and heavy dews, against the advice of Dr. Kirk: such exposure in any river on the West Coast would have laid the whole party up in a fortnight. Mr. Baines was several times knocked down in this way, and from overwork in the midday sun his head was very much affected, and he was obliged to be watched in his tent.

The country from Mazarro to Senna is exceedingly rich and in some places a good deal cultivated; at one garden he counted sixteen different productions, including cotton, tobacco, sugar, Indian corn, and several European vegetables; there is also fair wheat and excellent rice grown nearer the coast. Shupanga appeared to him to be the place for agricultural enterprise; a Portuguese farmer told him it was admirably adapted for cotton or sugar, but nobody would plant because it was quite uncertain who gets the crop, the natives or the owners. They all have to pay black mail to the Landeens, a Senhor Cruz, who pays 400 dollars to the government for his house, and in addition 500 dollars to the Landeens for permission to live there and make canoes; the government is not strong enough to protect them.

Whilst at Shupanga Captain Bedingfeld walked with Dr. Kirk and Mr. Thornton to some lakes about 20 miles to the north-west; the principal one was called "Bovie," and was, he should think, about 5 miles long and



3 miles wide; it abounds with hippopotami, but the water is not good to drink. The country is very fertile; during their march six Zulahs joined them from a party of about forty near Shupanga: these people came up this way after they were dispersed under Dingaana, at Natal, by the emigrant farmers. Upon their arriving at the village where they intended to pass the night, they found great difficulty in procuring food, the natives asking enormous prices, whereupon their Zulah chief came to their assistance, explaining that they were not Portuguese but Englishmen, liberators of the blacks, and that they could walk like men and had not to be carried; he had also heard of the white man living with Moselekatse: in the end they were supplied with everything they wanted, and were treated most hospitably without payment.

On their return they took a round through an immense forest that Dr. Kirk might get samples of the sandal wood and buaze; in addition to these trees they saw ebony and lignumvitæ. Dr. Kirk also found six different kinds of Indiarubber. It was remarked to him by a Portuguese, that "he could not understand our going 600 miles up the country to grow cotton that would never pay to be brought down to the coast when there was such a place as Shupanga so much nearer, healthy, the river navigable, and abundance of wood for use or exportation." The size of some of the trees near must be very large, as he measured one canoe 35 feet long, 4 feet deep, and 4 feet wide, of a kind of mahogany.

When he was at Quillimane the trade was almost dead; this was partly caused by the wars, but more, he was told by an American merchant, by the restrictions and difficulties thrown in the way of trade by the government. He had been obliged to take money for his goods, as there was little or nothing for barter. He had collected a small quantity of ivory, Indiarubber, and columba-root; the latter said to grow in abundance, but owing to the dry season burning up the leaves, the natives could readily discover the root; this gentleman had asked to go up to Tete to trade, but it was not allowed.

In conclusion he would now add his testimony to that of numerous English officers, to the ready assistance, great hospitality, and kind attention of the Portuguese generally; but he would especially mention Colonel Nunes, at whose house he was entertained for two months. The Colonel has been in the country thirty-five years, and is always ready with any information in his power. He was bound to say that his description of the rapids proved to be most correct: he also mentioned the lakes to the north of the Morumbala; he described them as a chain of lakes from which the Shiré took its rise, and also another river that he understood him to run to the eastward of the mountains. During his stay at Quillimane a caravan of "Mujoäs," from the Lakes, paid their annual visit, and brought with them for sale iron hoes, ivory, and a few slaves. The women had the peculiar bone thrust through the upper lip, mentioned by Dr. Livingstone, making them look perfectly hideous. So little demand was there for slaves at that time that an able-bodied man was offered at 6 fathoms of cloth, valued at 1½ dollars.

The CHAIRMAN observed that although the very small steamer, the *Ma Robert*, had been found by Dr. Livingstone to be too weak for the navigation of the Zambesi, no reflection could be cast upon her builder. That vessel had been constructed upon a given plan and for a particular purpose; and before she went out she was approved of by the Admiralty. But it had been found that this vessel was inadequate to do the work; her cabin was half water logged, and her bottom so full of holes that if Dr. Livingstone did not receive another vessel from the British Government, he must (as he wrote to his friends) procure one out of his own small means. This, however, he (the Chairman) felt confident the British nation would not allow; and he had great satisfaction in saying that Lord John Russell supported the request of Dr. Livingstone, and desired to furnish him with a new vessel.

MR. J. MACQUEEN, F.R.G.S., said,—The important papers just read offer a wide field for observation. At this late hour, however, it is impossible to enter upon the consideration of their contents to the extent I could wish. I must glance at them hastily, taking the geographical features properly first.

The River Chire, Xire, or Shiré, is no new discovery. It has been known to the Portuguese for more than two centuries as a large and important river, up which they formerly traded to a distance of thirty days' journey. It was known to have in some places rapids and cataracts. The early Portuguese travellers and writers called the name of the lower part of the river and the country around it Sherawa. They further called it the Nhanja in its upper course. Lacerda, Monteiro, and others decidedly and repeatedly state this, while they also decidedly give their opinion from what they considered good information that the river which passes the capital of Cazembe was the head stream thereof, and which is probably the fact. The northern Lake Nhanja alluded to by Dr. Livingstone is not a lake but a large river, called Nionja or Nhionja, which is in about lat. 14° S. and long. 36° E.; when crossed by Silva Porto in 1854, it was on the 29th of April, towards the close of the rainy season, one mile broad.

In this sense Father Codinho mentions this lake (*Lagao*: this word means fen, marsh, or a sheet of water which expands and contracts, or dries up, according to seasons and circumstances) in his *Travels to India in 1663*, and which, on the information of an intelligent Portuguese explorer, who had travelled over all that portion of Africa, and made a map thereof, is laid down as extending from 15° 50' S. lat., and called by him Zachaf. It communicated with the lower Zambesi below Senna, while its source came from a vast distance to the north. I feel obliged to Sir Roderick Murchison for calling my attention to a large manuscript map of the world now in the British Museum, and made by Antonio Sances, a Portuguese, in 1623. Thereon every part of the whole coast of Africa is laid down, with even greater accuracy than it is at the present day. That map has a lake lying due west from Quiloa, and in the position of what is at present called Lake Nyassa, and from this lake the great branch of the Zambesi, the Shiré, or Zachaf, is made to flow. Farther, that map gives the source of the White Nile at the foot of exceedingly high mountains close upon the Equator, and almost exactly as modern discovery shows it to be; its upper course also is delineated nearly as it is at present known, and has been pointed out to the Society by Mr. Macqueen in his paper presented last session.

It is not at all likely that the enterprising Portuguese would not know the capabilities of a river which they had known and included in their dominions for more than 200 years. The Zambesi was well known to them to a great distance beyond or above Zumbo, and they have always told us that the river was not fit for unobstructed commercial navigation, and that near Chocwa it was always said to be impassable. Dr. Livingstone has given us more minute information about the obstructions in some parts than they have done, but as regards the main point he gives us no more than is known, nor shows how difficulties that exist can be overcome. If a steamer drawing 2 feet water cannot move with safety, it is clear that another drawing 6 feet or 10 feet with proportionate power would never venture upon those ebb places, narrow channels, and terrible rapids with the slightest chance of success.

It is useless to shut our eyes to the fact that the expedition in its great object, namely, the exploration of the Zambesi as a valuable commercial channel, has for the present completely failed. The steamer, we are told, is not fit for the service. Be it so; but then it remains to remark where is the judgment which sent out a vessel 80 feet long and a hull only  $\frac{1}{8}$  of an inch thick on such an unknown and dangerous service to stem a stream running at the rate of 10 miles or more per hour, and to a country where no repairs could be effected?

Besides a heavy load of sugar manufacturing machinery, the vessel with such a thin skin had a ton of gunpowder on board.

We have seen the difficulties and dangers of the navigation of the river from the cataract above Tete. From Zumbo to the sea, a distance of 480 miles, the decline according to Dr. Livingstone is 1440 feet, or about 3 feet to the mile. But what must the difficulties and dangers be from Zumbo to the mouth of the Chobe, a distance of 360 miles, where the ascent of the river is 2101 feet, or equal to 6 feet per mile? It is well known that the rapids and cataracts in that space are numerous and great.

I am, I must confess, surprised at the noise made about sugar and cotton cultivation in Africa as being something new. Why, these agricultural productions grow in the greatest abundance all over Tropical Africa, and in many places to a greater extent than round the banks of the Lower Zambesi. In some places cotton cloth forms the currency of nations, and in almost all places the natives manufacture their own clothes from the wool. It was from Africa that the sugar cane was first carried to the Brazils and thence to the West Indies. Jabboo cotton cloth has for more than 200 years formed a large article of export from the Bight of Benin to the Brazils. It is much stronger than European cloth, from the staple of the cotton being longer and finer than that which is elsewhere obtained. The absurdity of sending American cotton seed to Africa to raise cotton is just upon a par with our knowledge of other African affairs. Coffee, all know, is most abundant in Africa. Enarea and Kaffa are, it may be said, its native country, and most of the coffee that comes from Mocha and that is called Mocha coffee comes from the quarter of Africa mentioned, while the whole Eastern Horn of Africa is and has been known for more than thirty centuries to be literally covered with frankincense.

Africa is a splendid field for European enterprise, but to make that enterprise successful we must begin on commanding positions near the sea coast. To attempt to raise bulky articles in the interior, 700 miles from the sea, without any roads or easy navigation to reach the spot, is the wildest delusion that ever entered the human brain, even were the lands ours—which they are not—while it must be by African hands, not European, that cultivation in Africa must be carried on. Attempts made in any other way must prove, as these have hitherto done, complete failures.

It is both ungenerous and unjust to reproach the Portuguese with idleness and the decay of their African colonies. The decline of the colonies of Portugal sprang from the effects of the terrible struggle in which she was engaged side by side with ourselves against the fearful military tyranny and despotism of France, led on by Napoleon the First, and which compelled her patriotic sovereign to seek refuge from his grasp in a distant portion of his colonial empire. But Portugal, though weak, has not lost her rights in Africa. Those rights we acknowledge, and also her authority to place custom houses at her different stations, when this country appoints, as it has done, a consul (Dr. Livingstone) for several of these places, which at once changes his character and acts from those of the Christian missionary to that of a political official agent. Moreover the colonies of Portugal will shortly teach other nations their productive value and importance.

In what I have stated, do not let it be for one moment supposed that I wish to detract from Dr. Livingstone's great labours, merits, and perseverance—perseverance which from my knowledge of tropical climates and countries in my opinion amounts at times to rashness; but to state that the previous labours undertaken and information given by others cannot justly be construed to lessen the value of his, while his opinions on commercial, agricultural, and political subjects may on some points be considered wrong by those practically acquainted as I am with tropical places and cultivation, and the nature and inclination and pursuits of their population.

The CHAIRMAN expressed the hope—notwithstanding the passing criticism of his friend Mr. Crawford—that the extracts which had been read from the communications of Dr. Livingstone would tell cogently in favour of the views of that zealous and able explorer, and induce the public to urge Her Majesty's Government to continue to support the Zambesi expedition which they had set on foot. It had been stated on the high authority of Sir George Grey, the Governor of the Cape, that if anything should happen to cause the failure of this expedition, the fame of which had gone far and wide, the effect upon British interests throughout South Africa would be most detrimental. The consideration of a small sum of money must not be suffered to check the prosecution of this important enterprise. He trusted that the sentiments entertained by the present meeting would have a just influence upon Her Majesty's Government, and would lead them to accelerate those measures which have the full sanction of the Minister for Foreign Affairs.

The CHAIRMAN finally adverted to the recent death of that eminently philosophical and great statesman the Hon. Mountstuart Elphinstone; but no justice could be done to such a name in a few brief sentences, and in due season the President of this Society would no doubt do all honour to the memory of that illustrious man.

At the next meeting, when the subject of the Map of Kashmir would be considered, he would read a letter from Lord Canning relating to the Engineers of India, which did so much credit to the head and heart of the Governor General that he was sure the meeting would hear the communication with much satisfaction.

*Third Meeting, Monday, December 12th, 1859.*

SIR RODERICK I. MURCHISON, VICE-PRESIDENT, in the Chair.

PRESENTATIONS.—*Captain H. H. Godwin Austen ; the Hon. and Rev. F. S. Grimston ; F. W. Davis, M.D., R.N. ; H. Harwood Harwood ; W. H. Purdon ; and Francis Tagart, Esqrs., were presented upon their Election.*

ELECTIONS.—*Captain G. Augustus Bedford, R.N. ; Rear-Admiral Sir H. Byam Martin, K.C.B. ; Henry Ancell ; Edward Butler ; Edmund Calvert ; William C. Hood, M.D. ; Henry Raikes, M.A. ; Edward Smith ; W. Castle Smith ; Richard Todd ; and James Watson, Esqrs., were elected Fellows.*

EXHIBITIONS.—The MS. Trigonometrical Survey of Kashmir, by Captain T. G. G. Montgomerie, F.R.G.S., under the direction of Lieut.-Colonel A. Scott Waugh, F.R.G.S., Surveyor-General of India ; sketches illustrative of Himalayan scenery, by Captain H. H. G. Austen and Mr. Purdon ; numerous sketches of scenery in British Columbia, including San Juan Island, &c., by Mr. Bedwell, R.N. ; a map of the Fraser River, by Captain G. H. Richards, R.N., F.R.G.S., of H. M. S. *Plumper* ; a plan of the Tien-tsin-ho, showing the Chinese defences, by Major Fisher, R.E. ; and a model of the Welcome gold nugget from Ballarat, by Professor Tennant, F.R.G.S., were exhibited.